Emerging Applications in Commercial Face Recognition

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Growth in commercial face recognition (FR) applications is out pacing government applications

- *Enabled by massive improvements in face recognition accuracy and efficiency*

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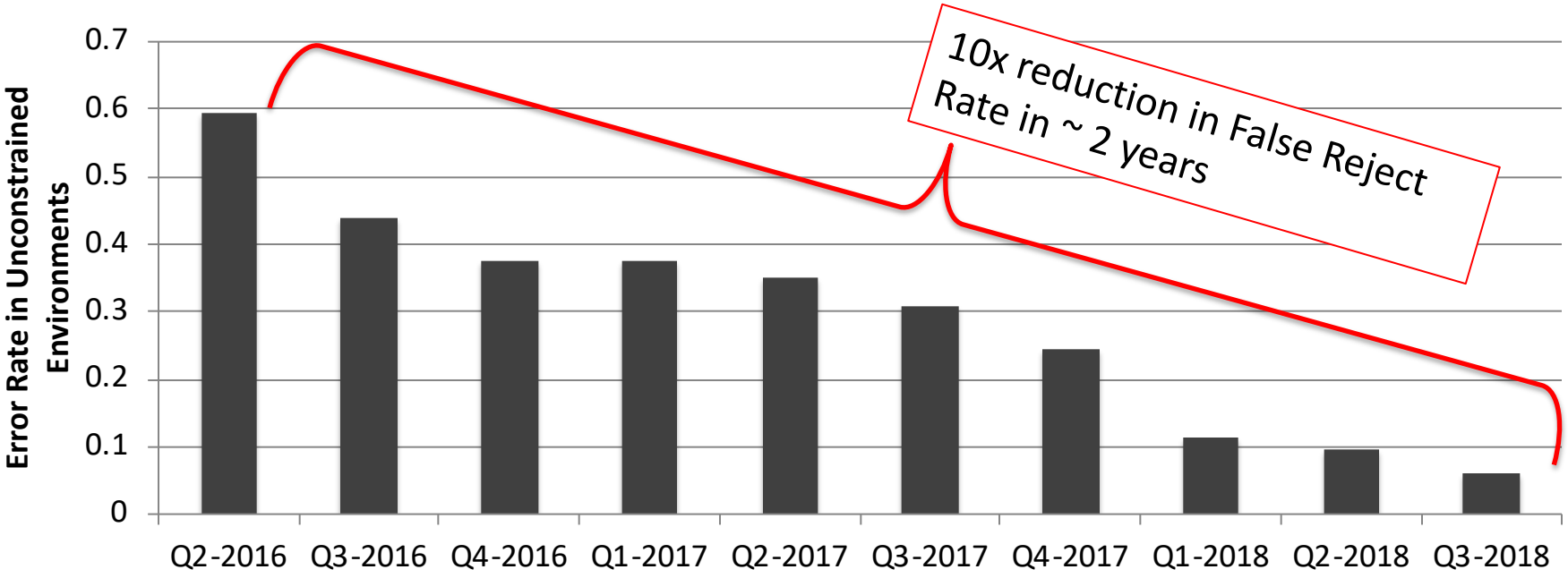
Improvements in accuracy and efficiency



Accuracy / error is measured on unconstrained facial imagery, characterized by natural variations in illumination, resolution, facial pose, expression and occlusion

Error rate is the identity verification *False Rejection Rates* at a fixed False Acceptance Rate of 1 in 10,000

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How are commercial industries using face recognition?

And how can NIST tests evolve to better assess effectiveness on these use-cases?

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ID Proofing and "Know Your Customer" (KYC)

- The shift to digital payments and platforms requires the need to digitally validate a customer's identity

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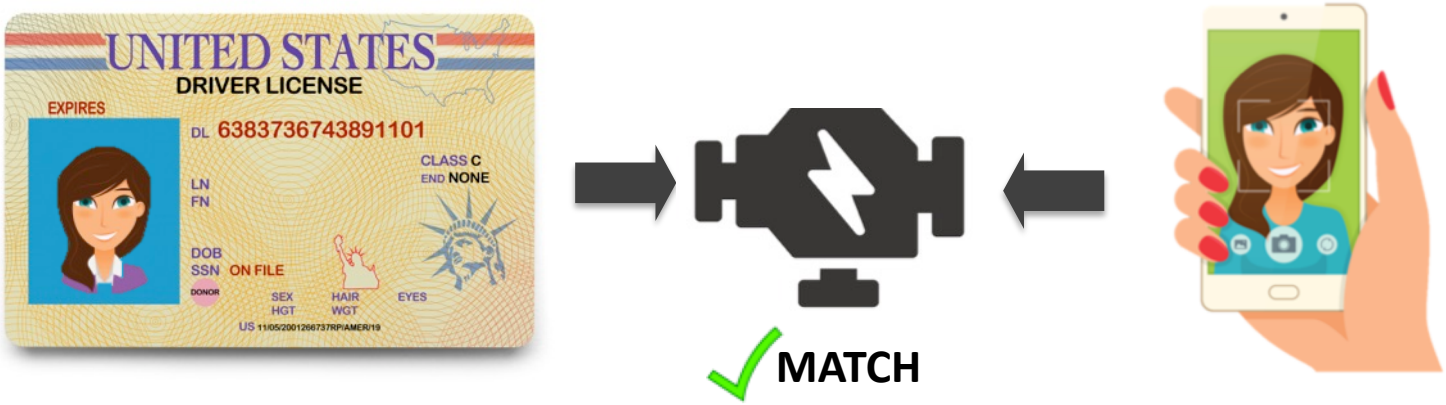
ID Proofing and KYC



- Requirements:
  - ✓ Highly accurate on “selfie” images
    - Pitch variations, inconsistent illumination, lens distortion
  - ✓ Highly accurate on scanned ID card photos
    - Holograms, printer artifacts, low-resolution, time lapse
  - ✓ Robust anti-spoof (liveness validation) using commodity sensors

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Real-time screening

- Real-time FR screening provides a great value proposition to secure stadiums, airports, schools, and critical infrastructure

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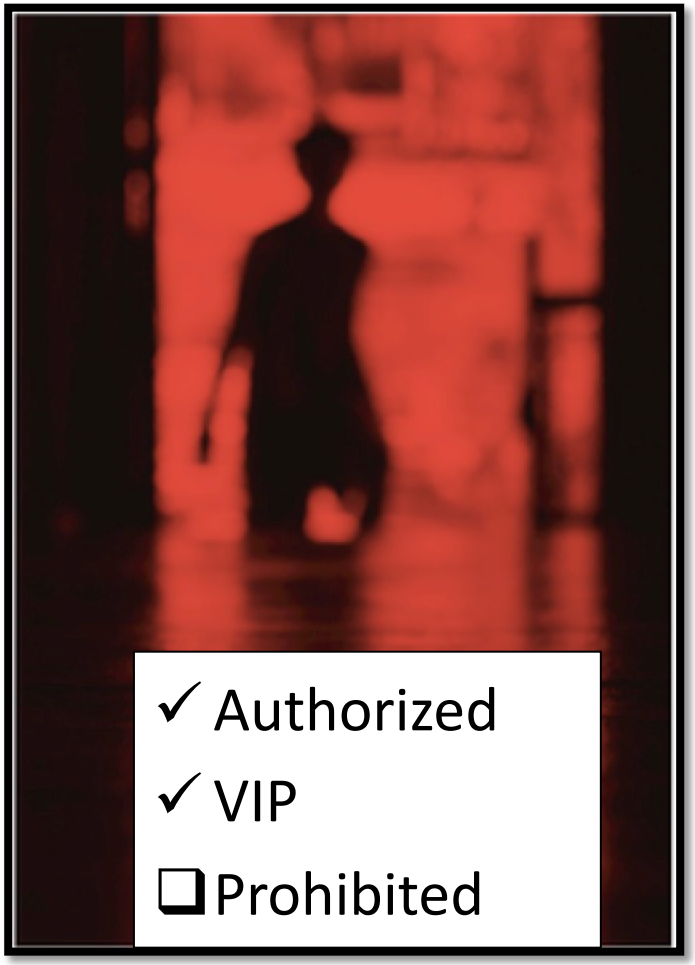
Real-time screening

- Requirements:
  - ✓ Accuracy in semi-unconstrained and semi-cooperative setting
    - Near frontal, semi-controlled lighting
  - ✓ Budget sensitivity
    - Hardware (compute and cameras)
    - Software licensing
  - ✓ Ease of integration / use
  - ✓ Watch-list identification (1:N+1)



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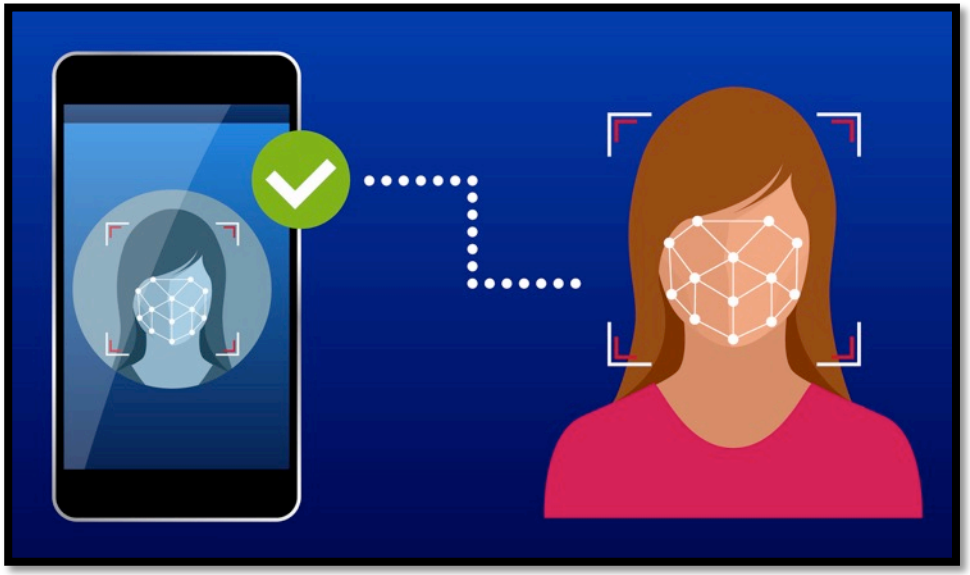
Access control



- ✓ Mobile device unlock
- ✓ Facility access
- ✓ Network authentication

- Authentication systems are increasingly relying on biometrics
- Face recognition is particularly appealing given contactless nature and sensor interoperability

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Access control

- Requirements:
  - ✓ Accuracy on selfie-style images
  - ✓ Extreme power efficiency
  - ✓ Minimal binary footprint (RAM)
  - ✓ Robust anti-spoof

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Slower Emerging Applications: Internet of Things

- Expectations are that our devices and surroundings know when we are present and adapt accordingly
- Requirements:
  - ✓ Strong accuracy in unconstrained setting
  - ✓ Extreme efficiency and support for low cost hardware (e.g., ARM)

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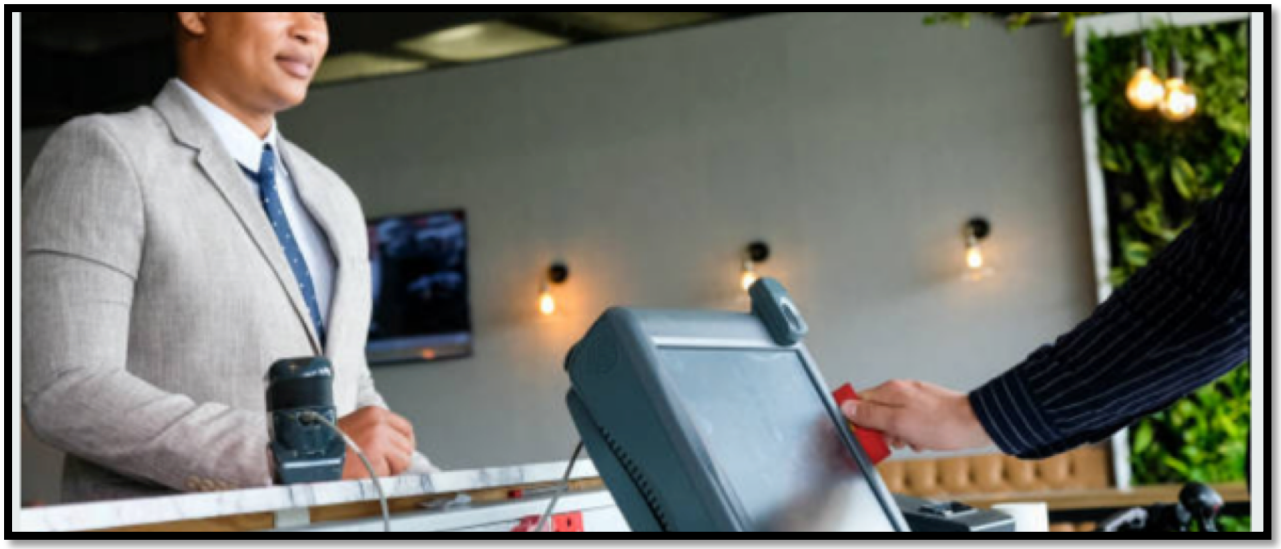
Slower Emerging Applications: Smart Retail



- Retailers want to know who is buying what products; both for individuals and demographic cohorts
- Customers want rewards
- Payment providers want reduced fraud
- Requirements:
  - ✓ Strong accuracy in semi-constrained setting
  - ✓ Low hardware and software costs

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Slower Emerging Applications: Medical Industry

- Accurate patient identification reduces fraud and streamlines services
- Requirements:
  - ✓ Efficiency for use in mobile devices

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How NIST FRVT can better support these applications

- Measure accuracy on additional datasets:
  - Selfie to ID scan (ID Proofing)
  - Selfie to Selfie (Device unlock)
  - Semi-constrained imagery to ID scan (e.g., FIVE data)
- Add more comprehensive efficiency metrics:
  - SDK binary size / peak memory usage
  - Enrollment and comparison speeds on ARM chips
- Include additional scenarios into Ongoing benchmarks:
  - Demographic estimation, anti-Spoof using generic sensors, watch-identification
- More collaboration with industry groups
  - Potential funding and data source

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Questions?

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